

What is Claimed is:

1 1. A automated task classification system that operates on a task objective
2 of a user, comprising:

3 a meaningful phrase generator that generates a plurality of meaningful phrases
4 from verbal and non-verbal speech, each of the meaningful phrases being generated
5 based on one of a predetermined set of the task objectives;

6 a recognizer that recognizes at least one of the generated meaningful phrases in
7 an input communication of the user; and

8 a task classifier that makes a classification decision in response to the
9 recognized meaningful phrases relating to one of the set of predetermined task
10 objectives.

1 2. The automated task classification system of claim 1, wherein the
2 meaningful phrases are expressed in multimodal form.

3 3. The automated task classification system of claim 2, wherein the
4 multimodal form includes inputs from at least one channel.

5 4. The automated task classification system of claim 1, wherein the
6 meaningful phrases include at least one of verbal speech and non-verbal speech

7 5. The automated task classification system of claim 1, wherein the non-
8 verbal speech includes the use of at least one of gestures, body movements, head
9 movements, non-responses, text, keyboard entries, keypad entries, mouse clicks,
10 DTMF codes, pointers, stylus, cable set-top box entries, graphical user interface entries
and touchscreen entries.

1 6. The automated task classification system of claim 1, wherein the user's
2 input communication received by the recognizer includes at least one of verbal and
3 non-verbal speech.

1 7. The automated task classification system of claim 1, wherein the
2 meaningful phrases in the user's input communication received by the recognizer are
3 derived from the user's actions.

1 8. The automated task classification system of claim 7, wherein the user's
2 actions include the user's focus of attention, the user's focus of attention being at least
3 one of pointing, directional head movement, gesturing, eye movement, and body
4 position.

1 9. The automated task classification system of claim 1, further comprising a
2 dialog module that enters into a dialog with the user to obtain a feedback response from
3 the user.

1 10. The automated task classification system of claim 9, wherein the dialog
2 module prompts the user to provide a feedback response that includes additional
3 information with respect to the user's initial input communication.

1 11. The automated task classification system of claim 9, wherein the dialog
2 module prompts the user to provide a feedback response that includes confirmation
3 with respect to at least one of the set of task objectives determined in the classification
4 decision.

1 12. The automated task classification system of claim 1, wherein the task
2 classifier routes the input communication based on the classification decision.

1 13. The automated task classification system of claim 12, wherein the task
2 objective is performed after the input communication is routed by the task classifier.

1 14. The automated task classification system of claim 1, wherein the system
2 operates in conjunction with one or more communication networks, the communication
3 networks including a telephone network, the Internet, an intranet, Cable TV network, a
4 local area network (LAN), and a wireless communication network.

1 15. The automated task classification system of claim 1, wherein the system
2 is used for customer care purposes.

1 16. The automated task classification system of claim 1, wherein the
2 classification decisions and corresponding user input communications are collected by
3 the system for automated learning purposes.

1 17. The automated task classification system of claim 1, wherein the
2 relationship between the generated meaningful phrases and the predetermined set of

task objectives includes a measure of usefulness of a one of the meaningful phrases to a specified one of the predetermined task objectives.

18. The automated task classification system of claim 17, wherein the usefulness measure is a salience measure.

19. The automated task classification system of claim 18, wherein the salience measure is represented as a conditional probability of the task objective being requested given an appearance of the meaningful phrase in the input communication, the conditional probability being a highest value in a distribution of the conditional probabilities over the set of predetermined task objectives.

20. The automated task classification system of claim 18, wherein each of the plurality of generated meaningful phrases has a salience measure exceeding a predetermined threshold.

21. The automated task classification system of claim 1, wherein the relationship between the generated meaningful phrases and the predetermined set of task objectives includes a measure of commonality within a language of the meaningful phrases.

22. The automated task classification system of claim 21, wherein the commonality measure is a mutual information measure.

23. The automated task classification system of claim 22, wherein each of the plurality of generated meaningful phrases has a mutual information measure exceeding a predetermined threshold.

24. The automated task classification system of claim 1, wherein the task classifier makes the classification decision using a confidence function.

25. The automated task classification system of claim 1, wherein the input communication from the user represents a request for at least one of the set of predetermined task objectives.

26. The automated task classification system of claim 1, wherein the input communication is responsive to a query of a form "How may I help you?".

27. The automated task classification system of claim 1, wherein each of the verbal and non-verbal speech are directed to one of the set of predetermined task objectives and each of the verbal and non-verbal speech is labeled with the one task objective to which it is directed.

28. An automated routing system that automatically routes a user's request based on an automated task classification decision, comprising:

a meaningful phrase generator that generates a plurality of meaningful phrases from verbal and non-verbal speech, each of the meaningful phrases being generated based on one of a predetermined set of task objectives;

a recognizer that recognizes at least one of the generated meaningful phrases in the user's request;

a task classifier that makes a classification decision in response to the recognized meaningful phrases relating to one of the set of predetermined task objectives; and

a task router that routes the user's request in order to perform at least one of the task objectives based on the classification decision..

29. The automated routing system of claim 28, wherein the meaningful phrases are expressed in multimodal form.

30. The automated routing system of claim 29, wherein the multimodal form includes inputs from at least one channel.

31. The automated routing system of claim 28, wherein the meaningful phrases include at least one of verbal speech and non-verbal speech.

32. The automated routing system of claim 28, wherein the non-verbal speech includes the use of at least one of gestures, body movements, head movements, non-responses, text, keyboard entries, keypad entries, mouse clicks, DTMF codes, pointers, stylus, cable set-top box entries, graphical user interface entries and touchscreen entries.

33. The automated routing system of claim 28, wherein the user's input communication received by the recognizer includes verbal and non-verbal speech.

1 34. The automated routing system of claim 28, wherein the meaningful
2 phrases in the user's input communication received by the recognizer are derived from
3 the user's actions.

1 35. The automated routing system of claim 34, wherein the user's actions
2 include the user's focus of attention, the user's focus of attention being at least one of
3 pointing, directional head movement, gesturing, eye movement, and body position.

1 36. The automated routing system of claim 28, further comprising a dialog
2 module that enters into a dialog with the user to obtain a feedback response from the
3 user.

1 37. The automated routing system of claim 36, wherein the dialog module
2 prompts the user to provide a feedback response that includes additional information
3 with respect to the user's request.

1 38. The automated routing system of claim 36, wherein the dialog module
2 prompts the user to provide a feedback response that includes confirmation with
3 respect to at least one of the set of task objectives determined in the classification
4 decision.

1 39. The automated routing system of claim 36, wherein if the task classifier
2 cannot make a classification decision after dialog is conducted with the user, the router
3 routes the user's request to a human for assistance.

1 40. The automated routing system of claim 39, wherein the task objective is
2 performed after the user's request is routed.

1 41. The automated routing system of claim 28, wherein the system operates
2 in conjunction with one or more communications networks, the communications
3 networks including a telephone network, the Internet, an intranet, Cable TV network, a
4 local area network (LAN), and a wireless communication network.

1 42. The automated routing system of claim 28, wherein the system is used for
2 customer care purposes.

1 43. The automated routing system of claim 28, wherein the classification
2 decisions and corresponding user requests are collected by the system for automated
3 learning purposes.

1 44. The automated routing system of claim 28, wherein the relationship
2 between the generated meaningful phrases and the predetermined set of task
3 objectives includes a measure of usefulness of a one of the meaningful phrases to a
4 specified one of the predetermined task objectives.

1 45. The automated routing system of claim 44, wherein the usefulness
2 measure is a salience measure.

1 46. The automated routing system of claim 45, wherein the salience measure
2 is represented as a conditional probability of the task objective being requested given
3 an appearance of the meaningful phrase in the user's request, the conditional
4 probability being a highest value in a distribution of the conditional probabilities over the
5 set of predetermined task objectives.

1 47. The automated routing system of claim 45, wherein each of the plurality of
2 generated meaningful phrases has a salience measure exceeding a predetermined
3 threshold.

1 48. The automated routing system of claim 28, wherein the relationship
2 between the generated meaningful phrases and the predetermined set of task
3 objectives includes a measure of commonality within a language of the meaningful
4 phrases.

1 49. The automated routing system of claim 48, wherein the commonality
2 measure is a mutual information measure.

1 50. The automated routing system of claim 49, wherein each of the plurality of
2 generated meaningful phrases has a mutual information measure exceeding a
3 predetermined threshold.

1 51. The automated routing system of claim 28, wherein the task classifier
2 makes the classification decision using a confidence function.

1 52. The automated routing system of claim 28, wherein the user's request
2 represents a request for at least one of the set of predetermined task objectives.

1 53. The automated routing system of claim 28, wherein the user's request is
2 responsive to a query of a form "How may I help you?".

1 54. The automated routing system of claim 28, wherein each of the verbal and
2 non-verbal speech are directed to one of the set of predetermined task objectives and
3 each of the verbal and non-verbal speech being labeled with the one task objective to
4 which it is directed.

1 55. An automated task classification system, comprising:
2 a recognizer that recognizes at least one meaningful phrase in an input
3 communication of a user; and

4 a task classifier that makes a classification decision in response to the
5 recognized meaningful phrases relating to one of a set of predetermined task
6 objectives.